

## BOOK REVIEWS

FROM MINERALOGY TO GEOLOGY. The Foundations of a Science, 1650-1830. Rachel Laudan, 1987. The University of Chicago Press, Chicago and London. xii + 278 p., hardbound. \$27.50.

Laudan stresses that contrary to the received view of the history of geology (by Lyell and repeated by Geikie), geology started at the end of the eighteenth century, not the early nineteenth; that it was a development within mineralogy; that "...the Wernerians formulated the conceptual foundations of geology and dominated its intellectual and institutional development in the period between 1780 and 1830," and finally, that it was not a British but a German accomplishment issued from the Becher-Stahl school.

What could have been an interesting new approach, unfortunately rests on a playing down of Hutton as a religious man who did not understand consolidation of rocks (who did at that time?) and who furthermore "killed" historical geology, whereas Werner has made "...the formation the central part of historical geology" and thus provided a key concept.

What does Laudan mean by "formation"? Under the provocative title of "Formations Time is the Essence" (p. 94), she quotes Werner's manuscript, cited by Ospovat, saying that Werner believed that the "...essential differences between rocks of various kinds are 'mode and time of formation'". Unfortunately, the quotation is truncated in an unscholarly manner. Indeed, Werner wrote (*in* Ospovat 1971, p. 19): "In the design of this classification and description I have focused my sole attention on the various large rock masses, as far as these can be observed, of which nature has built our solid earth; on the search for their essential differences, based on their mode and time of formation; and on the classification and characterization of these differences according to the nature of these rock masses. (I have underlined the missing text).

Indeed, when Werner prepared to put in order the vertical sequence of rocks in Saxony, he used for his "formations" three criteria: 1. Mineralogical composition and crystallinity (granite, greywacke, sandstone, limestone, and so on). 2. Mode of deposition, a vague concept limited to a few remarks on stratification and postulated turbulence and depth of the waters of the retreating ocean. 3. Time of deposition, namely the application of the law of local superposition, proposed before by Steno.

Moreover, what Werner called "formation," intrinsically contains a time factor and is therefore quite different from the modern definition of a formation, namely a lithologically defined unit devoid of time concept. Therefore, Werner's "formation" could not be the central part of "historical geology" because the latter is based on the time concept, that is the succession of time rock units such as Devonian or Jurassic defined by index fossils.

In short, since Laudan's anachronistic approach of relating Werner's "formations" and "historical geology" taints the entire book because it is the main issue of her theory, this approach is clearly detrimental to her otherwise excellent review of seventeenth- and eighteenth-century aspects of mineralogy.

Reference - Ospovat, A. M. 1971. (translated and with an introduction and notes) Werner, A. G. Short classification and description of the various rocks. Hafner Publishing Company, New York, 171 p.

Albert V. Carozzi, Department of Geology, University of Illinois at Urbana-Champaign, Urbana, IL 61801-2999.

GEORGE WILLIAM FEATHERSTONHAUGH: The first U.S. Government geologist. Edmund Berkely and Dorothy Smith Berkeley, 1988. University of Alabama Press, University, Alabama, 357 p., \$39.95, hardcover.

For anyone interested in the history of geology, knowledge of G.W. Featherstonhaugh (1780-1866) is both essential and hard to obtain. This book does an excellent job of bringing a misunderstood man into clearer focus. Featherston, as he was called, was many things: the force behind the first railroad in America; a pioneer in scientific agriculture; an essayist, poet, and novelist; a lobbyist; a linguist; and a daring diplomat who saved the king and queen of France from certain death. Intellectually, his strongest tie was with geology.

Always rugged, optimistic, and durable, Featherston was suited to the grueling field work faced by early geologists in the United States and Canada. Some intellectuals hated little towns on the wild frontier and many suffered in poorly provisioned field camps. On good days and bad, Featherston liked the wilderness and he set a hearty pace. On a march, he wanted the party moving by 6. If field work was not possible, he used the time creatively, for example noting the language of Indian porters. He was busy and productive in any environment, always ready for polite conversation, and also good with his fists, if needed.

Some field associates became his adversaries. He felt they were lazy and uncommitted; they saw him as unhumanly intense. He could become the stalwart of an enterprise even when he was not supposed to be in charge. His personality and energy led to professional conflict, hostile interchange in print, and litigation, all of which have clouded his role in intellectual history. This biography has done much to lift the clouds. It deals with his work in agriculture, diplomacy, and other aspects of a long and productive life. His geologic work is emphasized below.

Featherston was born in England and came to the United States in 1806, bringing a good name and little else. His family circumstances precluded a university education, but social connections allowed him to travel widely as part of a Royal navy group touring Europe. Geology was one of his interests when he emigrated, but he grew more involved in agriculture and the railroad movement. In 1826, he returned to England; William Smith lived in his home town. They spent time together with Smith instructing him in field techniques and theory. Over the next few months, he met Buckland, Murchison, and Sedgwick and maintained correspondence with them for years; he also traveled on the Continent and met other geologists. When he returned to America in 1828, he used his skill as an essayist to write on the theory and practice of geology.

By 1831 he was issuing the short-lived *Monthly American Journal of Geology and Natural Science*. In addition to offering an outlet for his articles it broadened his contacts. Eventually, he had an immense correspondence, which made him a nuclear person in the growing national scientific community. On another level, his productive pen and social graces made him an effective spokesman in Congress and elsewhere for causes he valued. One project made him "The first U.S. Government Geologist."

In 1834 Congress authorized the War Department to explore between the Missouri and Red Rivers; they chose to employ the British Featherston, who had socialized widely to promote his interests. This led to a series of contracts for geological work in various parts of the country that lasted until 1838. Then he was asked to survey the boundary between Maine and Canada which was in dispute between Great Britain and the United States. Featherston declined because he was British, and relationships with the War Department became strained, leading to his resignation. He soon left the United States and emerged as a key member of the British boundary survey team. This change in national service did not sit well in the United States, but it did lead to some impressive work in the border zone that continued into the 1840's. After 1844 Featherston has no direct tie with North American geology.

The Berkeley's biography of George W. Featherstonhaugh is interesting, well-researched, and well-written. It is a balanced study of a complex man who did so much work and generated much controversy. It should be on the bookshelf of anyone who is interested in the history of American geology.

James X. Corgan, Austin Peay State University, Clarksville TN 37044

**NATHANIEL SOUTHGATE SHALER AND THE CULTURE OF AMERICAN SCIENCE.** David N. Livingstone, 1987. The University of Alabama Press, Tuscaloosa and London. 395 pp., 3 portraits, hard cover. \$32.95.

This is not a conventional biography. The only chronology in a traditional sense is a complete bibliography with a content analysis of Shaler's publications. For the geologist who wants a factual account of his scientific training, field research, geological discoveries, and contributions to the earth sciences, this is not the source he may be seeking. The standard biographical sketches in various encyclopedias may supply the need for most such purposes.

This volume, however, has a different approach. It places Shaler in the scientific culture of his time. It is concerned with what Shaler thought about science, religion, social theory, philosophy, racism, etc., and how all of these were revolutionized by the great idea of evolutionary theory which became the central theme of American culture during Shaler's time.

The volume details such matters as the mental struggle Shaler experienced in reconciling his scientific knowledge with his religious beliefs, his uncertainty about environmental determinism, his persisting belief in a designed world, the elusive interplay between environment and heredity, his straddling preservationism on one hand and conservatism on the other with his own environmental ethic, his bridging the gap between catastrophism and uniformitarianism, his struggle to keep the principles of isostasy and eustasy in balance, his encouragement for the fusion of natural and spiritual worlds, as well as the union of pure and applied science in the realm of education, and the general relationship of natural history (especially geography) to social history.

The book is very well written and is based on sound scholarship, thorough documentation, and thoughtful interpretation. Shaler's thoughts and interpretations expressed in his prolific publications, unpublished manuscripts, and public lectures are analyzed and integrated with philosophical thinking of the day. It is Shaler's relation to humanity and society, his stand on religion and race, his interpretation of history, and his philosophy of life which form the core of this volume.

For those aspects, Livingstone's fine and exhaustive work, and his sensitive interpretation, may well be regarded as definitive in establishing Shaler's niche in the philosophical culture of American science.

Ralph W. Dexter, Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

**AN AMERICAN TOPOGRAPHER:** The working years of George Stanley Druhot, 1914-1963. G. S. Druhot, 1985 Landmark Enterprises, 10324 Newton Way, Rancho Cordova, California. x, 238 pages, 35 figures, hardcover. \$35.00

Anyone who has done field work for the U.S. Geological Survey will agree that this book sums up the Survey's fascination: the opportunity to do work so interesting that one overlooks skimpy per diem, arbitrary changes in program, lack of adequate supervision (often the best training program there is), and the difficulties of raising a family under these conditions. If Druhot complains, it is in the mildest of terms.

Druhot, an almost entirely self-trained surveyor, began his career with the Survey near his home town in Ohio. When he began, he made buggy-wheel traverses, counting the revolutions of a white rag tied to the wheel. Forty years later, when he retired, he had worked on trimetrogon compilation and photogrammetry. In between, he was mostly a field topographer, and apparently a very fast mapper judging from his record of square miles completed per month. As would be expected, his records were meticulous, and I was amused to realize, after reading for a while, that a major source for this autobiography is Druhot's account books. He knew what he paid for everything, but he also wrote poetry, which shows a humor that doesn't come out in his prose.

Druhot is fascinated by his craft, and there's a lot here for the non-topographer. I knew about whoop-and-holler traverses, but was fascinated by Druhot's discussion of mapping steep forested slopes in Hawaii, when his rodman's answering holler was deflected by the slope, causing an offset in contour lines.

Through a life of constant wandering, Druhot never lost his zest for surveying, and his wife, despite years of hastily arranged rental quarters, never lost her zest for him. They and their daughter had fun together. On rainy days Druhot would let his rodman go home, and he, his wife, and his daughter would drive around town counting houses for the topographic map.

Although more detailed than some readers would wish, this is a valuable piece of history: important work as described by one who did it. It shows what the U.S. Government gets for its money.

Frank C. Whitmore, Jr. - Department of Paleobiology, National Museum of Natural History, Washington, DC 20560

**THE ENCYCLOPEDIA OF FIELD AND GENERAL GEOLOGY.** Charles W. Finkl, Jr. (Ed.), 1988. Van Nostrand Reinhold, New York. x-xvii, 910 p, hardcover. \$89.95.  
**McGRAW-HILL ENCYCLOPEDIA OF THE GEOLOGICAL SCIENCES.** 2nd ed. Sybil B. Parker (Ed.), 1988. McGraw-Hill Book Company, New York. xvi, 722 p. \$85.00

Compendia are extremely difficult to review. In some ways it is like trying to critique a telephone book; most of what is needed is present and one becomes concerned only when

a particular number wanted at a particular time is not available. When the book provides the data as it does far more than 99% of the time, no comment is necessary. So it is with these two works.

It is not very likely that many individuals will buy the first book listed for personal use; it is a reference to be consulted from time to time. By the same token it is a useful reference and one to be consulted frequently. History as such is not a topic, but a fair number of the longer references include historical notes. Most items provide citations to the literature.

Alphabetical order is to be expected in such a reference, but in this book it is nicely supplemented by appropriate cross-references. The subject index has about 3,500 entries. Comparison to an early edition of Lahee's "Field Geology" provides a good notion of changes in the profession, as a significant part of this book contains items on Acoustical Surveying, Geobotanical Prospecting, Indicator Elements, and a host of topics not considered by the field man half a century ago. On the other hand, while one is pleased to see pages of Geomorphology and Geophilately, they are hardly field subjects.

The Encyclopedia by McGraw-Hill covers a wider field than does the work of Finkl. Much of the material has appeared in the Encyclopedia of Science and Technology, but the editor notes that half of the entries are rewritten and 40 of the 520 are new. Most of the entries are shorter than in Finkl's compendium, although some long essays are included. It has about the same number of items in the index, but many more illustrations. There are a few clearly historical entries, including one on geological survey. Nevertheless, again, I would not buy it, but I would certainly scheme to have the library obtain a copy.

A strong point for each encyclopedia is an index to authors. Excellent scientists have contributed to both works. They are both good and one cannot say that one is better than the other.

Ellis L. Yochelson, *c/o* Department of Paleobiology, National Museum of Natural History, Washington, DC 20560

THE YOUNG EARTH: An introduction to Archaean Geology. E. G. Nisbet, 1987. Allen & Unwin, London. 402 p., paper cover, \$34.95.

This is quite a remarkable book. In only 350 pages of text, Dr. Nisbet, University of Saskatchewan, captures the full sweep of Archaean geology, that began just after the end of planetary accretion (4.5 - 4.4 billion years ago) and ended at the beginning of the Proterozoic (about 2.5 billion years ago). Important events happened during this long span of earth history, such as the origin of life and the beginning of plate tectonic processes. Nisbet emphasizes that the time-honored dictum that "the present is the key to the past" is not necessarily valid for the Archaean; heat-flow rates were probably much greater and the oceans and atmospheres were still evolving in composition. In short, things were different then, and an understanding of just how different can only come from a careful study of the ancient rocks, the only tangible remnants of this long period of time.

In a book that contains a great deal of geological meat, but at the same time is digestible to the educated layman, one can learn about Archaean terrains, (including oceans and continents), volcanism, mineral deposits, and a host of other subjects. Although the book does not address history of science topics related to the Archaean, it is an invaluable

resource and helps explain why geologists have had such a difficult time interpreting the early rocks. Numerous diagrams and photographs assist in conveying the many concepts that are presented. A rather comprehensive bibliography is included, as well as a glossary for assistance to the non-geologist. At \$1.50 per 100 million years of earth history, the book is a bargain.

Richard S. Fiske, Department of Mineral Sciences, National Museum of Natural History, Washington, DC 20560.

PATTERSON AND PATTERSONS. J. P. Glusker, B. K. Patterson and M. Rossi (eds.), 1987. International Union of Crystallography and Oxford University Press, Oxford, England. 725 p., hardcover, \$65.00.

In November 1984 a historic symposium commemorated the life and career of Arthur Lindo Patterson. The date was linked to the 1934 paper in which Patterson showed how x-ray diffraction intensities could be made to yield direct information on the interatomic distances and configurations in a crystal, by means of phase independent Fourier synthesis. Following Laue's discovery of the diffraction of x-rays by crystals in 1912, and Bragg's demonstration in the following decades of the great power of this phenomenon to reveal the atomic arrangement in more and more complex crystals, the techniques of crystal structure analysis until 1934 remained a matter of guesswork. Patterson's contributions in 1934 and 1935 did not provide a solution to the phase problem, but they represented a great step forward. The advent of his method was as momentous as that of the Hauptman-Karle methods in the 1960's. Patterson never received any big prizes; like many scientists he seemed satisfied with his bibliographic record and tended to avoid public kudos. The symposium where 300 crystallographers gathered to honor his memory was a tribute to his friendship and his inspiration.

The transactions of that symposium have now been published, lavishly done on fine white paper and handsomely bound. All the lectures are included with following discussion and comments. But the book is much more than that; the formal program occupies only part II. A great deal of additional personal material is here - letters, reminiscences, an unpublished paper by Patterson, history - making a rich collection indeed. Of the four parts, I and IV, which contain mainly written and oral history, are for me by far the most interesting parts. In part IV, 26 crystallographers have each recalled personal impressions of and experiences with A. L. Patterson. In these paragraphs, this extraordinary scientist, teacher, and human being comes back to life.

Patterson's career passed through many of the principal centers of crystallographic research in the 1920's and 30's. Like most people of his generation, he was very much restrained in his creative potential by the economic depression. He was basically an experimental physicist, and in this capacity he finally came into his own when he was appointed Head of the Department of Physics of the Institute for Cancer Research, and given the means to build a modern x-ray diffraction laboratory. It was like living for years between grindstones, then looking up one day and seeing the clear blue sky.

The Patterson function is very much alive today. It is applied in at least 50 percent of crystal structure analyses published today, and is still absolutely essential to the solution of protein structures and other biological structures of similar magnitude. What a pleasure this volume is! From the highly technical to the utterly human level it makes marvelous reading, especially for an old-timer like me.

Howard T. Evans, Jr., Mail Stop 959, U.S. Geological Survey, Reston VA 22092



A SHORT HISTORY OF VERTEBRATE PALAEOLOGY. Eric Buffetaut, 1987. Croom Helm, London & Routledge, Chapman & Hall, New York. Hardcover, 223 p. frontispiece, 18 figures. \$59.95.

To dispose of a reviewer's workaday obligations, the book is well-edited and produced. It is gratifying to find the publisher among the few who still employ a proofreader. Seemingly he nodded off over ceratop(s)ians (p. 132) and palaeo(n)ologist (p. 136). Syllabification continues to be a victim of new printing techniques, with demonstrat-ion and verteb-rates added to the list. It is Smithsonian Institution, not Institute! Otherwise, the highly readable flowing prose reveals no hint that the author's first language is not English.

More to the point, this is simply an excellent little book (199 octavo pages of text). "Its aim is to relate the major events and phases in the study of fossil vertebrates, from its pre-scientific beginnings to, roughly, the First World War, with a few comments added on more recent developments." It meets and exceeds this goal as succinctly as imaginable, a sure sign of the author's mastery of his subject. From an obviously deep reservoir of both factual knowledge and broad comprehension, he has selected well the material to impart an accurate impression of the role and character of vertebrate paleontology in western science and culture. This book is an ideal starting point for the sophisticated layperson, generalist, geologist, or evolutionary biologist. Further, if I were again teaching a college course in vertebrate paleontology, I would assign it as a first week's reading before plunging into any nuts-and-bolts textbook. Lastly, I recommend this as a good read for the practicing vertebrate paleontologist, apt to be too busy or too specialized to see the forest for the trees.

As I am a benign francophile, I was preadapted to find this a gallicized history (nothing could be easier on Cuvier's coattails) -- not so; the treatment is consistently cosmopolitan in approach. Further, the author has noted French acquisition of fossils as spoils of war, has recounted an unsavory incident of French paleontological propaganda, and even has alluded to shortcomings of Cuvier. One small exception to the exemplary evenhandedness is that the author underestimates Thomas Jefferson's contributions and comprehension, undoubtedly on the authority of G.G. Simpson who was all too assiduous in debunking the Jefferson myths. (For an antidote read S.A. Bedini, 1985, "Thomas Jefferson and American Vertebrate Paleontology" Virginia Division of Mineral Resources Publication 61).

Even with only "a few comments added on recent developments," the words phylogenetic systematics and/or cladistics are *de rigueur*. This methodology has caused the most profound restructuring of the language of the profession since the spread of Darwinism which "sometimes led to conflict between the old generation of palaeontologists... and their younger colleagues who tried to use a stricter methodology." The more things change...

I recommend this book enthusiastically.

Clayton E. Ray, Department of Paleobiology, National Museum of Natural History, Washington, DC. 20560

GEOLOGY OF THE HENRY MOUNTAINS, UTAH, AS RECORDED IN THE NOTEBOOKS OF G.K. GILBERT 1875-76. Charles B. Hunt, 1988. Geological Society of America Memoir 167, Boulder CO. Hardcover, 229 p., \$52.50.

C.B. Hunt deciphers and interprets the field notes on the Henry Mountains made by Grove Karl Gilbert, one of the great American geologists who explored little known areas in the West and made fundamental contributions to a developing science. Profusely illustrated by Gilbert's field sketches

and drawings taken from microfiche, the notes are supplemented by vertical and oblique aerial photographs, modern photos of areas sketched by Gilbert, and illustrations from Hunt's earlier reports on the Henry Mountains. Combined with Hunt's publication of Gilbert's Pleistocene Lake Bonneville notebooks (1982, Brigham Young University Geology Studies, v. 29 (1), 225 p.) this volume is a significant contribution to the history of geology in North America.

Covering 10 field notebooks recording Gilbert's explorations over parts of two years, each book a chapter, Hunt summarizes each chapter by a page giving dates and subjects covered; this is printed in bold face on a subdued relief model map of the Henry Mountains and Vicinity which was first published by Gilbert. The 10 chapters are preceded by an Introduction prepared by Hunt, giving the history of the Gilbert's project, Gilbert's developing geologic concepts as recorded in the notebooks, and the acknowledgments. Original page numbers and Gilbert's dates annotate the text. Sketches are tied to the text by decimals in which the numbers to the left of the decimal indicates the notebook and numbers to the right are sequential for that chapter.

Hunt's explanatory comments are italicized within square brackets so that no questions arise on the sources of included material. The author's remarks modernize stratigraphic units, clarify geography, suggest probable errors in Gilbert's magnetic orientation of sketches, and shed light on ambiguities in locations. Figure captions expand Hunt's interpretation of Gilbert's sketches and text by personal knowledge of having been on the same spot 60 years later.

Gilbert's geologic sketches range from very simple line drawings to more elaborate and artistic landscapes which remind one of more recent geologic sketches by the late P. B. King. Some of these more elaborate drawings were traced from the original microfiche, but obvious joining across the spine of the notebook witness the unretouched character of many of the longer figures.

The book makes fascinating reading for anyone who has worked in the stratigraphy of the Plateau country, students of igneous intrusion, those concerned with history of geology and geologic ideas, and any geologists who visited the Henry Mountains under the guidance of C.B. Hunt. This book is a labor of love on the part of the author, as anyone who has tried to use another's field notes can attest. We all owe Charlie Hunt a debt of gratitude for this addition to Gilbertiana.

Douglas M. Kinney, 5221 Baltimore Avenue, Bethesda, MD 20816.

THE OCEAN OF TRUTH, A Personal History of Global Tectonics. Henry W. Menard, 1986. Princeton University Press, Hardcover, 353 p., \$29.95.

Henry W. Menard records how science is really done. As one of the active participants in the plate tectonics revolution, it is appropriate that the late Bill Menard would provide us with his personal impression of the evolution of global tectonics from 1900 to the late 1960s. As an insider, his commentary is both pertinent and insightful. In completing this work, prior to his terminal illness in 1986, Menard achieved his goal of conveying his views of how one of the most important revolutions in earth science history transpired; developments after 1968 are deliberately omitted. This is not just one more review, but, rather, a collection of essays and sketches in which "I tell it as I remember it." It interrelates the role of key players, development of instrumentation, and exciting surface and subsurface crustal discoveries on land and sea. It also brings into focus significant factors, such as the role of the U.S. Navy in supporting research. Also considered are how and in what



sequence were findings in various Western European countries consolidated with those in the U.S.S.R. and the, then, three major U.S. oceanographic institutions: Lamont (now Lamont-Doherty), Scripps, and Woods Hole.

Most previous reviews of this field have emphasized the "nuts and bolts" of plate tectonics, such as paleomagnetism, median rifts, and transform faults. These are discussed, but not in detail. What is of greater interest are personal vignettes relating to the sequence of events leading to the plate tectonics hypothesis. For instance, what is the background of the priority dispute as to whether Hess or Dietz first proposed the idea; or, what was the Ewing - Heezen controversy all about? Reading this book is like working on a jigsaw puzzle with pieces of varying size, shape, and color. To complete this analogy, Menard's account enables us to better understand why the picture was not revealed progressively, but rather as a series of discontinuous phases. The concept of sea-floor spreading was the result of brilliant, industrious, and highly competitive personalities, who worked independently and moved in different directions, and, at times, even operated at cross-purposes. Plate tectonics was by no means a collegial effort by many working toward a common goal.

Menard's account is a grand overview that links philosophy, history, and even sociology. One particularly valuable aspect is the emphasis on the role of multiple and near-simultaneous discoveries in science. It is also useful to reflect on the author's final observation that scientists are often so busy that they do not have time to think, and, as a result, fail to recognize the obvious. A case in point is the major post-World War II ocean expeditions which failed to realize the importance of magnetic anomalies off California. In Menard's review of the personal attributes of the "inventors" of sea-floor spreading and plate tectonics, he found that the age of the principal participants was not a key factor. In fact, it was creativity, imagination, boldness, and persistence that resulted in numerous multiple discoveries. Moreover, other factors being equal, it is his point that "credit for an idea may be related to the effort expended in publicizing it." We can only hope that early in the next century someone with Menard's flair and vision will do as well in recording the evolving history of global tectonics.

Daniel Jean Stanley, Division of Sedimentology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560

**THE EXPLORING EXPEDITION IN THE ROCKY MOUNTAINS** by John C. Fremont, 1845. Reprinted 1988, with introduction by Herman J. Viola and Ralph Ehrenberg. Smithsonian Institution Press. Paperback, 319 p. \$14.95.

**EXPLORATION OF THE VALLEY OF THE GREAT SALT LAKE** by Howard Stansbury, 1851. Reprinted 1988, with introduction by Don Fowler. Smithsonian Institution Press. Paperback, 421 p. \$24.95.

These two books are the first of the Smithsonian Institution's "Exploring the American West" series, which features reprints of rare and out-of-print reports prepared by our nation's first explorers. Such an undertaking is to be welcomed by anyone interested in the history of science, American history, or adventure travel. The Fremont book was first printed in 1845 by order of the U.S. House of Representatives, and the Stansbury book was Executive Document 3 for the special session of the U.S. Senate in March 1851. Both books have similar themes, but each stands alone in commemorating its author.

Both authors were affiliated with the U.S. Army Corps of Topographical Engineers--and there all similarity between them ends. John C. Fremont, a controversial character throughout his adult life, became a legend in his own time through his early adventures in Western exploration, his candidacy for President, and in a brief term as first Territorial Governor of Arizona. In contrast, Howard Stansbury, a nonflamboyant, career U.S. Army officer, is known to few except academic historians.

Each book includes an introduction written by members of the "Exploring the American West" editorial board. Readers will find that these introductions provide excellent background for understanding the explorers and the times in which these reports were written.

Fremont's book covers two expeditions: one between the Missouri River and the Rocky Mountains (1842-43) and the second to Oregon and northern California (1844-45). These expeditions were actually more military than scientific, but one member of the expedition--a German cartographer by the name of Charles Preuss--mapped the topography, sketched the landscapes, and collected plants and fossils. The descriptions of the few plant collections, which were salvaged from a disastrous flood, are included in the book's appendices. The more detailed descriptions are from the collections of the 1844-1845 expedition, where many of the described plants represented both new genera and species. There are only a few maps reproduced in this book, none of which covers the entire route.

Fremont's initial expedition marks the first attempt to navigate river rapids in a rubber raft (Fremont and his men survived; their raft and equipment did not). His was also the first expedition to the West in which photographs were taken; sadly, both equipment and photos were lost with the raft. In spite of setbacks such as these, Fremont's mapping successes were such that he became the model for all government explorers who followed him.

Stansbury's book (although it begins in the same area of the country from which Fremont embarked) concentrates on the valley of the Great Salt Lake. Stansbury was sent to explore this region in detail; his surveying expedition was the first to encircle the Great Salt Lake. Whereas Fremont's expedition had collected plants and fossils almost incidentally, Stansbury's expedition conducted one of the first systematic series of observation on the flora, fauna, geology, and climate in the region which they covered. These scientific observations of the American West are part of the book's extensive appendices, and are the main reason why Stansbury's book is longer than Fremont's.

Stansbury's expedition was also the first to use the new surveying technique of triangulation to precisely locate geographical features in an area west of the Mississippi. The route he surveyed was the ultimate route of the Union Pacific Railroad, which joined the Central Pacific Railroad at Promontory, Utah, in 1867 to form the Transcontinental Railroad. Surprisingly, no examples of these maps are reproduced in the Stansbury book.

Stansbury was the first person to write, in an official capacity, an objective and sympathetic report on the Mormon communities of Utah Territory. Along his route, he also observed and described the lifestyles of Native Americans.

Except where noted, both books are reprinted in their entirety, including appendices. The geology and paleontology appendices in both books consist of reports prepared by none other than James Hall, paleontologist with the New York State Geological Survey, who was the subject of a special issue of *Earth Sciences History* in 1987. These reports, coupled with the narratives in the books, are among the first general geologic descriptions of parts of the American West. The

botanical and zoological appendices of Stansbury's book contain the first systematic descriptions of many new species, including a "Monographic Essay of the Genus *Phrynosoma*" (by Charles Girard); this genus, exclusive to western North America, contains that reptilian symbol of the American West, the horned lizard. The lithographs reproduced in both books are magnificent; my only quibble is that some of the pictures in the Fremont book are not placed closely enough to the text they refer to.

The writing style in both books is typical of the 19th century--long, flowery sentences--but it is just this style which plunges the reader back in time. Both books are filled with gloriously detailed accounts of these expeditions. Stansbury's books in some ways easier than Fremont's to use as a reference, because it is divided into chapters with detailed tables of contents and also contains an index. Stansbury's style is more systematic; almost every journal entry begins with a barometric pressure and temperature reading. Nonetheless, his writing conveys the excitement and hardships that were part of all scientific expeditions in those days. The narrative of Fremont's book was actually written by his wife, Jessie Benton Fremont, who added her own graceful style to her husband's dictation. This fact is pointed out in the Introduction and seems to have been well known at the time; it is not, however, acknowledged anywhere in the text.

The incidents described in these books will be appreciated by anyone who enjoys adventure travel. There are undoubtedly particular passages that will impress certain readers. For example, no one who has ever run a river should miss Fremont's heart-stopping account of running totally uncharted rapids.

Stansbury's book attests to the challenge faced by the early naturalists in describing ecosystems that they were seeing for the first time. This challenge is apparent in the descriptions of a prairie dog village. Stansbury's men were unable to retrieve a prairie dog they shot for their collection because, when they approached the hole into which it had fallen, they heard hissing of "rattlesnakes" near the burrows' entrances. Almost as an afterthought, Stansbury recorded the presence of burrowing owls in the village, "and this strange association of reptile, bird, and beast seem to live together in perfect harmony and peace". The explorers could not know that they probably heard burrowing owls; these owls, when alarmed, make a sound very much like a rattlesnake's hiss (Grinnell et al., 1930, p. 236).

The books can be read both for the scientific observations (when "doing science" frequently involved risking life and health) and the romance of exploring what was then "the Great American Desert"--a great blank spot on the map of North America. The reasonable prices for these books make them well worth obtaining.

Gretchen Luepke  
U.S. Geological Survey  
345 Middlefield Rd., MS-999 Menlo Park, California 94025  
U.S.A.

#### Reference

Grinnell, J., Dixon, J., & Linsdale, J.M., 1930, Vertebrate natural history of a section of northern California through the Lassen Peak region: Univ. Calif. Publ. Zoology, v. 35, 594 p.

THE 1740 DESCRIPTION BY DANIEL TILAS OF STRATIGRAPHY AND PETROLEUM OCCURRENCE AT OSMUNDSBERG IN THE SILJAN REGION OF CENTRAL SWEDEN. Hollis D. Hedberg, 1988. The American Association of Petroleum Geologists Foundation, 96 pp., hardcover.

The book concerns itself with the occurrence of oil and gas in the Siljan Ring in the Dalarna province in Sweden, and with the history of the region. This area has come to prominence recently because of the exploratory work for gas by Valtenfall, a Swedish government agency responsible for energy needs. Although the recent exploration of the Siljan region has been prompted by the ideas of Thomas Gold, the author points out that there has been a history of 250 years behind it.

This book is divided into two parts. The first part begins with the description of the geologic setting followed by a history of observations of hydrocarbons and their occurrence in Sweden. It is interesting to note that the first observations date back to the early part of the 17th century attributed to Linnaeus. Although Linnaeus in 1734 noted the occurrence of oil in the region, the first detailed work was published by Tilas (1740). The book continues with several other notes from many noted geologists over the next two hundred years.

A complete section is devoted to the description of the current drilling activity in the Gravberg-1 Deep Hole by Dr. E. Norling. The drilling had reached a depth of 6600 meters in 1987. The study of the cores (calcite cement, fluid inclusions, trapped gases, etc.) seem to indicate that throughout geologic time there has been circulation of fluids originating both at shallow depths and in the interior. The meteorite impacted rocks with their fractures extending into depths have created an unusual geologic setting permitting the mixing of gases of more than one origin.

The information on the current activities can be obtained from many other sources and Hedberg's book is not really about this activity but about history and the fascinating work of a 17th century geologist named Tilas. In this regard the book is an important document complete with the original printing of Tilas' paper in Swedish. I found the second part of the work most interesting. In addition to the Tilas paper in Swedish, this part contains a word-to-word (not always possible) translation for the English reader and provides a rare exposition of the thoughts of a 17th century explorer.

S. K. Saxena, Professor of Geology, Department of Geology, Brooklyn College, CUNY, Brooklyn, NY, 11210

#### SIGNIFICANT PAPERBACK REPRINTS

The University of Chicago Press is one of the few publishers to issue a softcover at lower price, after the hardcover edition has been produced. Two recent titles are worth noting.

"The Great Devonian Controversy" by Martin Rudwick has been previously reviewed. The paperback edition is as fine as the original. At a price of \$19.95, this is simply too good a bargain to pass up. Historians of science and geologists who want to read and reread a thoroughly engrossing work should have a copy.

Thomas F. Glick edited "The comparative reception of Darwinism" in 1978. It has been issued with a new preface. In 505 pages the various authors review how the ideas of Charles Darwin were received in more than a dozen countries. Several different essays cover each country, and special topics are included. Although there is little that is directly germane to geology, Darwin was one of ours and at \$17.95, the book will certainly expand one's perspectives.



# INTERESTING PUBLICATIONS

Since the start of this journal, Editor Gerald M. Friedman has prepared this column. Contributors wishing to list recent books and papers of interest to our membership are requested to send them to the Editor.

Amberger, Gad, Carozzi, Albert V., Charollais, Jean, Decrouez, Danielle, Ruchat, Claude and Zaninetti, Louisette, 1988, *Histoire géologique du Salève d'Horace-Bénédict de Saussure à nos jours*: Archs. Sci. Genève, v. 41, p. 1-42.

Appel, T., 1987, *The Cuvier-Geoffroy debate: French biology in the decades before Darwin*. Oxford University Press, 305 p. £29.50.

Baker, V.R., 1988, Geological fluvial morphology: Geol. Soc. America Bull., v. 100, p. 1157 - 1167. The history of the American fluvial geomorphology over the past century as viewed as one of conflict and crises.

Barrett, P.H., Gautrey, P.J., Herbert, Sandra, Kohn, David, Smith, Sydney, eds., 1987, *Charles Darwin's notebooks, 1836 - 1844, Geology, transmutations, of species, metaphysical enquiries*: British Museum (Natural History), London, and Cornell University Press, Ithaca, New York, 747 p. \$75.

Beggs, S.S., 1988, Centennial activities offer unique events: Geotimes, v. 33, p. 10 - 11.

Berkeley, Edmund and Berkeley, D.S., 1988, *George William Featherstonhaugh the First U.S. Government geologist*. Univ. of Alabama Press, Tuscaloosa, Alabama, 357 p.

Bunt, E.A., 1977, highlights of engineering research in South Africa, p. 427 - 453, in Brown, A.C., ed., *A History of Scientific Endeavour in South Africa*. A collection of essays published on the occasion of the Centenary of the Royal Society of South Africa. 516 p. Includes some mining geology.

Cain, J.A., 1988, Creationism and mammal origins: Jour. Geol. Education, v. 36, p. 94 - 105.

Cassidy, G.J., 1988, *George Frederic Matthew: Invertebrate Paleontologist*: Geoscience Canada, v. 15, p. 157 - 163.

Cluver, M.A. and Barry, T.H., 1977, *Advances in South African Vertebrate Paleontology*, p. 318 - 338, in Brown, A.C., ed., *A History of Scientific Endeavour in South Africa*. A collection of essays published on the occasion of the Centenary of the Royal Society of South Africa. 516 p.

Craig, G.Y. and Dudich, Endre, 1988, *International commission on the history of geological sciences: Episodes*, v. 11, p. 3 - 4.

Darragh, T.A., 1987, *The Geological Survey of Victoria under Alfred Selwyn, 1852 - 1868: Historical Records of Australian Science*, v. 7, p. 1 - 25.

Destombes, M., 1987, *Contributions sélectionnées à l'histoire de la cartographie et des instruments scientifiques*. Selected contributions to the history of cartography and scientific instruments, in Schilder, P.C.J. van der Krogt and S.W.G. de Clercq, eds. 592 p.

D'Urville, D., 1888, *Two voyages to the South Seas (1830 - 1840)*, Rosenman, Helen, translator and ed. Two volumes. Melbourne University Press. \$75.

Ellenberger, F., 1988, *Histoire de la géologie: Technique et Documentation*, Dept. Edition et Diffusion, Lavoisier, Paris, France, 360 p., 165 F.

Ellison, S.P., Jones, J.J. and Owen, Mirva, editors, 1987, *The flavor of Ed Owen - a geologist looks back*, 142 p. Order from Earth Enterprises, P.O. Box 627, Austin, TX 78767. \$11.

Engel, C.G., 1987, *Rocks in my head*. New York, Vantage Press, Inc. 203 p. \$10.95.

Ganis, G.R., 1988, *Iron-mining store scrip in Pennsylvania: Pennsylvania Geology*, v. 19, p. 2-5.

Gill, M.A.V. and Knell, S.J., 1988, *Collection, Collectors and museums of note*. No. 54, Tunbridge Wells Museum: *Geology and George Abbot (1844 - 1925): The Geol. Curator*, v. 5, p. 3 - 16.

Gladish, L.E., 1988, *GSA first officers elected at Cornell: Geotimes*, v. 33, p. 17 - 19.

Gohau, Gabriel, 1987, *Histoire de la géologie*. Paris, Editions la Découverte, 259 p.

Gould, S.J., 1987, *Essays about books and ideas*: W.W. Norton, 255 p. (1987). \$18.95.

Gould, S.J., 1988, *The verdict on creationism*: New York Teacher, v. 29, No. 15, p. 8.

Groot, J.J., 1988, *the Delaware Geological Survey: The formative years 1951 - 1969*: Delaware Geol. Survey Spec. Publ. No. 17, 28 p.

Guilbert, J.M., 1988, 100 years of economic geology: Geol. Soc. America Bull., v. 100, p. 811 - 817.

Houghton, S.H., 1977, *South African Geology*, p. 339 - 357, in Brown, A.C., ed., *A History of Scientific Endeavour in South Africa*. A collection of essays published on the occasion of the Centenary of the Royal Society of South Africa. 516 p.

Hedberg, H.D., 1988, *The 1740 description by Daniel Tilas of stratigraphy and petroleum occurrence at Osmundberg in the Siljan region of central Sweden: The Tilas Translation*: American Assoc. Petroleum Geol., Catalog 553.

Hoyt, W.G., 1987, *Coon Mountain controversies: meteor crater and the development of impact theory*. Forward by Eugene M. Shoemaker. Tuscon, University of Arizona, 442 p. \$40.

Hunt, C.B., 1988, *Geology of the Henry Mountains, Utah, as recorded in the notebooks of G.K. Gilbert, 1875 - 76*. Geol. Soc. America Memoir 167, 299 p. \$52.50.

Lafuente, Antonio and Estrella, Eduardo, 1988, *Scientific enterprise, academic adventure and drawing-room culture*



- in the Geodesic Mission to Quito; p. 13 - 31, in Saldaña, J.J., ed., *Cross Cultural Diffusion of Science: Latin America*, Soc. Latinoamericana de Historia de las Ciencias y la Tecnología, Cuadernos de Quipu 2, Mexico, D.F., 133 p.
- Livingstone, D.M., 1987, Nat Southgate Shaler and the culture of American science. Univ. of Alabama Press, 395 p. \$32. 95.
- McCarry, Charles, 1988, Three men who made the magazine: National Geographic, v. 174, p. 287 - 316.
- Morrell, J.B., 1988, The early Yorkshire Geological and Polytechnic Society: a reconsideration: Annals of Science, v. 45, p. 153 - 167.
- Multhaupt, R.P. and Good, Gregory, 1987, A brief history of geomagnetism and a Catalog of the collection of the National Museum of American History. Smithsonian studies in History and Technology, 48. Washington, D.C. Smithsonian Institution Press, 87 p.
- Norton, Mary, 1988, Well Done Well # 7: Aramco World, v. 39, p. 6 - 13. Discovery in March 1938 of the Jurassic Arab zone oil reservoir in Arabia.
- Pettijohn, F.J., 1988, A century of geology 1885 - 1985 at the Johns Hopkins University. Baltimore, Gateway Press, Inc. 316 p.
- Pickett, T.E., 1988, James C. Booth - the papers of a nineteenth-century chemist-geologist: Collections, University of Delaware Library Associates, v. 3, p. 20 - 35.
- Pollard, D.D. and Aydin, Atilla, 1988, Progress in understanding jointing over the past century: Geol. Soc. America Bull., v. 100, 1181 - 1204.
- Preston, D.J., 1986, An excursion into the American Museum of Natural History. St. Martin's Press, 244 p. \$18.95 cloth, \$4.50 paper.
- Saldaña, J.J., ed., *Cross Cultural Diffusion of Science: Latin America*, Soc. Latinoamericana de Historia de las Ciencias y la Tecnología, Cuadernos de Quipu 2, Mexico, D.F., 133 p.
- Schröder, Wilfried, ed., *Historical events and people in Geosciences*. M. Berne, Frankfurt, New York, 220 p.
- Smath, M.L. 1988, Kentucky Survey's history and challenges: Geotimes, v. 33, No. 10, p. 23-25.
- Smith, M.L., 1988, Pacific visions. California scientists and the environment. New Haven, Ct., Yale University Press, 243 p. \$26.50.
- Smith, P.J., 1988, Early mining in South Australia: Geology Today, v., 4, p. 30 - 34.
- Society for the History of Natural History, 1988, From Linnaeus to Darwin: Commentaries on the history of biology and geology: Soc. for the History of Natural History, Spec. Publ. No. 3, 217 p., \$25.
- Stafford, R.A., 1988, Roderick Murchison and the structure of Africa: a geological prediction and its consequences for British Expansion: Annals of Science, v. 45, p. 1 - 40.
- Tasch, Paul, 1987, Influence of Lyell's *Principals* on Darwin's evolutionary concepts: The Compass of Sigma Gamma Epsilon, v. 65, p. 2 - 11.
- Turner, Susan, 1988, Charles Moore's fossil fish from Queensland: the Geol. Curator, v. 5, p. 20 - 22.
- Wahl, F.M., 1988, GSA celebrates past and looks to future: Geotimes, v. 33, p. 12 - 14.
- Wall, B.H., 1988, Growth in a changing environment. The Hibbert Group, CN-06150, Trenton, New Jersey, 08650. \$12. History of the Exxon Corporation 1950 - 1975.
- Walliser, O.H. and Alberti, Liselotte, 1987, Die Geschichte der Geologie und Paläontologie in Göttingen (the history of geology and paleontology at the University of Göttingen): Nachrichten der Universität Göttingen, Georgia Augusta, p. 73 - 76.
- Wiley, R.R., 1987, The Tuscan meteorites. Their history from frontier Arizona to the Smithsonian. Smithsonian Inst. Press, Washington, D.C., 48 p. \$8.45 (paper).
- Yochelson, E.L., 1988, *The Bulletin of the Geological Society of America* and Charles Doolittle Walcott: Geol. Soc. America Bull., v. 100, p. 3 - 11.
- Zartman, R. E., 1988, Three decades of geochronologic studies in the New England Appalachians: Geol. Soc. America Bull., v. 100, p. 1168 - 1180.



#### CHARLES DARWIN - A GEOLOGICAL ANNIVERSARY

31 October 1988

Held at Burlington House, Geological Society of London, London, England. Speakers:

F.H.T. Rhodes, Cornell University, "Darwin's Search for a theory of the earth: Symmetry, Symplicity, and Speculation".

J.A. Secord, Imperial College, "A Geological Education: Darwin before the *Beagle*".

Sandra Herbert: University of Maryland, "Darwin as a prospective Geological Author".

#### JOINT ATLANTIC SEMINAR IN THE HISTORY OF BIOLOGY

March 31 - April 1, 1989

YALE UNIVERSITY  
Call for Papers

The twenty-fourth annual meeting of the Joint Atlantic Seminar in the History of Biology will be held March 31 - April 1, 1989 at Yale University.

Those wishing to present a paper should send a title and short abstract by February 1, 1989 to F.L. Holmes, History of Medicine, Yale University, P.O. Box 3333 Yale Station, New Haven, CT 06510.

Preference will be given to recent Ph.D's and advanced graduate students, but submissions are also encouraged from more senior scholars and non-professional students of the history of life sciences.

There is a good prospect that some funds will be made available by the History of Science Society for unaffiliated scholars to participate in the JAS. Details will be known after September 30, 1988. Those interested in applying for such support are encouraged to inquire to F. L. Holmes at above address.

The EYLES MEMORIAL SYMPOSIUM is the title of a history of geology conference held in Bristol, England on the 29 and 30 of September, 1988 by the Society for the History of Natural History.

For more than forty years Joan and Victor Eyles were the focus for British work in the history of geology. Through their own research projects, and the help and advice they unstintingly gave to others, the Eyles influenced a whole generation of enthusiasts.

## AMERICAN GEOLOGICAL INSTITUTE

### SCHOLARSHIPS FOR MINORITY GEOSCIENCE STUDENTS ACADEMIC YEAR 1989 - 1990

#### PROGRAM

The American Geological Institute's Minority Participation Program (AGI-MPP) expects to offer scholarship aid to outstanding geoscience majors for the academic year 1989-90. Thirty-five scholarships were awarded for the 1988-89 academic year. Funding for support/financing of this program has come from geoscience societies and industries (petroleum, mining, environmental, etc.), and from individuals.

#### QUALIFIERS

Those eligible are geoscience and geoscience education majors who are United States' citizens and members of one of the following ethnic minority groups which are under-represented in the geosciences: American Black, Hispanic, and Native American (American Indian, Eskimo, Hawaiian, and Samoan). The applicant must have good academic records, meet financial need criteria, and be currently enrolled in an accredited institution as either an undergraduate or graduate student majoring in geoscience. The term "geoscience" is used broadly to include major study in the fields of geology, geophysics, geochemistry, hydrology,

It is appropriate that in September 1988, with the magnificent Eyles Library now housed in the University, historians of geology met in Bristol to honor their memory and carry on their work. The theme of the meeting was the development of geology, both in Britain and on the Continent, in the century up to 1839, the year of the death of William Smith.

The Society is particularly grateful to Professor R.J. Savage of the Department of Geology, and to George Maby and Nick Lee of the University Library's Special Collections Department for their help with conference arrangements.

meteorology, oceanography, and planetary geology, as well as geoscience education with specific focus in these disciplines.

#### APPLICATION PROCEDURE

An official transcript, three letters of recommendation, and a fully completed AGI-MPP application form must be received no later than February 1, 1989 (all application materials post-marked after January 31, 1989 will be invalid). It is the applicant's responsibility to follow up on those persons who have agreed to write letters of reference, and to ensure that all materials are received prior to the deadline.

**NOTE:** Current recipients of AGI-MPP scholarships MUST re-apply in order to be considered for 1989-90 awards. Scholarships are NOT automatically renewed.

**DEADLINE FOR SUBMITTING COMPLETED APPLICATION IS FEBRUARY 1, 1989.**

For more information or for scholarship application materials contact:

AGI Minority Participation Program  
American Geological Institute  
4220 King Street  
Alexandria, VA 22302  
703/379-2480

#### Travel Grants to the ICHS

Invited speakers and authors of contributed papers may apply for travel grants to attend the XVIII International Congress of History of Science, to be held in Hamburg and Munich, Federal Republic of Germany, 1 - 9 August 1989. Confirmation of the acceptance of contributed papers is not required for this application, but awards will be conditional on obtaining that confirmation. (The deadline for receipt of abstracts by the Congress Organizing Committee is 31 January 1989). Scholars in the history of science, medicine, technology, and related fields are eligible. Applicants must be citizens or permanent residents of the United States.

Applications using this form should be sent to Alexandra K. Wigdor, Principal Staff Officer, National Research Council, U.S. National Committee for the International Union of the History and Philosophy of Science, 2102 Constitution Ave. [GP 176], Washington, DC 20418. Supporting documents that must be submitted along with this application form include 1) an abstract of your paper, including a brief statement of the scholarly significance of the topic (not to exceed one single-spaced typed page); and 2), a curriculum vitae (not to exceed 2 pages). Applications must be received by 31 January 1989. Please apply earlier if at all possible.

These grants, administered by the National Academy of Sciences/National Research Council, are subject to several restrictions. Grants can be applied only to air and ground transportation and are likely to cover only the equivalent of the lowest-cost excursion airfare. Grants paid by U.S. Government funds require the use of U.S. flag carriers for air travel. Payment can be made only after the ICHS on receipt by the NAS/NRC office of transportation receipts or copies and of a brief report of the grantee's activities at the meeting. Travel may not begin before the notification and acceptance of the grant.

## NATIONAL ACADEMY OF SCIENCES/NATIONAL RESEARCH COUNCIL

U.S. NATIONAL COMMITTEE FOR THE  
INTERNATIONAL UNION OF THE HISTORY AND PHILOSOPHY OF SCIENCE

### APPLICATION FOR TRAVEL GRANT

XVIII INTERNATIONAL CONGRESS OF HISTORY OF SCIENCE  
1-9 AUGUST 1989  
HAMBURG AND MUNICH, FEDERAL REPUBLIC OF GERMANY

Deadline for receipt of application: 31 January 1989. Please apply earlier if at all possible. Please read the accompanying instructions and notes and enclose the supporting documents there described. Type or print your answers. Send to Alexandra K. Wigdor at the address given above.

Name _____	Have you sent an abstract and registration form to the Organizing Committee? _____
Mailing address _____	_____
_____	Title of your paper: _____
_____	_____
_____	Section to which submitted (from 2d circular) _____
Telephone _____	_____
Are you a citizen or permanent resident of the United States? _____	Other applications made for travel grants to the 1989 Congress _____
Institutional affiliation _____	_____
_____	Financial contribution you expect to obtain from your university \$ _____
Society memberships _____	If you are an invited speaker, what portion of your costs will be met by the _____
_____	Congress organizers? _____
Is your paper invited or is it contributed? _____	Airport from which travel will originate? _____

## CALENDAR

**Dec. 27-30** - Annual History of Science Society Meetings, Cleveland. Program Co-Chairs: Joan L. Richards, Box N, Dept. of History, Brown University, Providence, RI 02912; Shirley A. Roe, Dept. of History, U-103, University of Connecticut, Storrs, CT 06268.

1989

**March 28-April 9** - "The Murchison Symposium: An International Symposium on the Silurian System," sponsored by the Subcommission on Silurian Stratigraphy, The Palaeontological Association, The Geological Society of London. University of Keele, U.K. Convenors: Dr. M. G. Bassett, Department of Geology, National Museum of Wales, Cardiff CF1 3NP, U.K. Telephone: (0222) 397951 and Dr. P.D. Lane.

**July 9-19** - 28th International Geological Congress, Washington, D.C. USA. NOTE K1-K.4: History of Geology Symposia. NOTE FIELD TRIP T169: "Boston to Buffalo, in the footsteps of Amos Eaton and Edward Hitchcock," Wed. 28 June through Sat. 8 July. Cost: \$1,000. NOTE FIELD TRIP T206: "Geology and History of the Chesapeake and Ohio Canal, Maryland," Sat. 15 July. Cost \$52 (minibus, breakfast on canal boat, box lunch). DEADLINES: Abstracts - October 1, 1988. Preregistration at normal rate - Feb. 1, 1989; Late Preregistration - May 1, 1989. Congress Registration and Payment: 28th Int'l Geological Congress, P.O. Box 727, Tulsa, OK 74101-0727 USA. Inquiries and general correspondence: Dr. Bruce B. Hanshaw, Secretary General, 28th Intl Geological Congress, P.O. Box 1001, Herndon, VA 22070-1001 USA. Telephone 703/648-6053. Telex: 248418.

**July 24-Aug. 4** - International Association of Geomagnetism and Aeronomy, Exeter. Interdivisional Commission on History presents two 1/2 day sessions entitled "The History of Geomagnetism and Aeronomy," and "Problems of Uncertainties in Geophysical Time Series." First Session Program: Scientific Biographies and general aspects of the History of Geomagnetism and Aeronomy. Second Session Program: Longterm Data Analysis, Long-term Relationship in Solar-Terrestrial Physics, Auroral Physics, Maunder-Minimum, Short-term Data and Geophysical-Meteorological Data Analysis. ABSTRACT DEADLINE: March 15, 1989 (Title, Author(s), Address(es), Text within rectangle not exceeding 160mm wide by 32mm high). Convener: W. Schröder, Hechelstrasse 8, D-2820 Bremen-Roenebeck, Federal Republic of Germany.

**Aug. 1-9** - XVIIIth International Congress of the History of Science to be held in Hamburg and Munich, Federal Republic of Germany. General theme: "Science and Political Order (Wissenschaft und Staat)" intended to comprise all facets of the relations between science (technology and medicine) and the numerous forms of political order. Symposia, Scientific and Poster Sessions. Chairman, National Program Committee: Prof. Fritz Krafft (Fachbereich Mathematik, Staudinger Weg 9, D-6500 Mainz, F.R. of Germany). Chairman, Organizing Committee: Prof. Christoph J. Scriba, Institut für Geschichte der Naturwissenschaften, Bundesstr. 55, D-2000 Hamburg 13, F.R. of Germany.

## MISCELLANEA

\* The International Society of Soil Science has a "Working Group on History, Philosophy, and Sociology of Soil Science," and the group produces a NEWSLETTER of possible interest to H.E.S.S. members. If you have items of note to submit, or wish to know more about the newsletter, you may write: Dan H. Yaalon, Institute of Earth Sciences, The Hebrew University, Jerusalem 91 904 ISRAEL.

\*\*\*\*\*

\* The Nineteenth Annual "Binghamton" Symposium concerned "THE HISTORY OF GEOMORPHOLOGY From James Hutton to John Hack." The September 1988 conference was held at Brock University, St. Catharines, Ontario. Keith Tinkler (Brock University) brought together an international contingent of speakers who presented a strong and wide-ranging program.

\*\*\*\*\*

\* The 28th International Geological Congress will be held July 9-19, 1989 in Washington, D.C., USA. The following papers on the History of Geology are to be presented:

The idea of time: changing concepts of the antiquity of Man and the Earth ; Martin Guntau, Claude Albritton, and Cecil J. Schneer

The origin, distribution, and adequacy of mineral and energy resources: historical evolution of geologic, mining, and environmental perspectives; John H. DeYoung, Jr., and John J. Schanz, Jr.

The Trans-Atlantic exchange of geological ideas during the nineteenth century

Meteorite impact: consequences for the history of geological ideas; Ursula B. Marvin

Kennard B. Bork  
Geology and Geology  
Denison University  
Granville OH USA 43023



# Annual Index to Volume 7, 1988

SUBJECT INDEX TO VOLUME 7, 1988

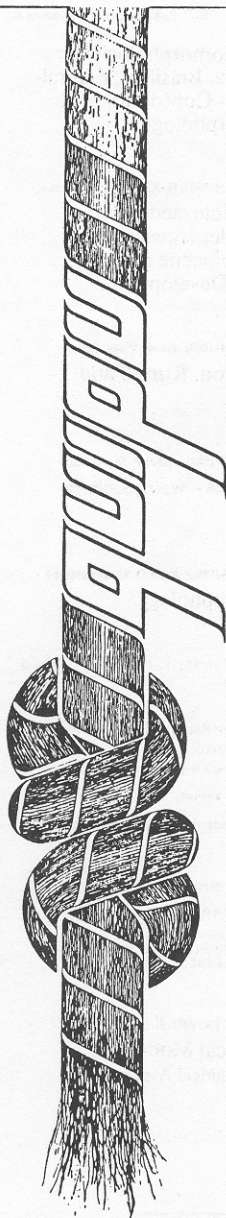
ESH	07-01	1-22	THE GEOLOGICAL SCIENCES AT HARVARD UNIVERSITY FROM 1788 TO 1850; Clifford Frondel
ESH	07-01	23-26	MISINTERPRETATIONS OF SOME EARLY CALIFORNIA GEOLOGISTS (1865-1951); Mason L. Hill
ESH	07-01	27-32	A HISTORY OF GEOLOGY AND EDUCATION IN CHINA (TO 1949); Dazheng Zhang and Carol Faul
ESH	07-01	33-43	THE INFLUENCE OF THE UNIVERSITY OF HEIDELBERG ON THE DEVELOPMENT OF GEOLOGY IN NORTH AMERICA BETWEEN 1860 AND 1913; Julianne P. Mahler and Hermann W. Pfefferkorn
ESH	07-01	44	JEAN BAPTISTE DE LAMARCK -- THE FIRST ENVIRONMENTALIST; Curt Teichert
ESH	07-01	45	ALBERT EINSTEIN AND MEANDERING RIVERS; Kent A. Bowker
ESH	07-01	46-51	ON THE 1946 DISCOVERY OF THE PRECAMBRIAN EDIACARIAN FOSSIL FAUNA IN SOUTH AUSTRALIA; Reginald C. Sprigg
ESH	07-01	52-63	BOOK REVIEWS
ESH	07-01	63	REPORT OF HESS SECRETARY - 1987
ESH	07-01	64	REPORT OF HESS ACTING TREASURER - 1987
ESH	07-01	64	ANNOUNCEMENTS
ESH	07-01	65	INTERESTING PUBLICATIONS
ESH	07-01	68	CALENDAR
ESH	07-01	69	MISCELLANEA
ESH	07-02	70	PREFACE: HISTORY OF REEF STUDIES; Joseph T. Gregory
ESH	07-02	71-89	A LOOK BACK AT THE PERMIAN REEFS OF WEST TEXAS AND NEW MEXICO; J. Keith Rigby and Ann Bracken
ESH	07-02	90-98	THE DUKE, THE PROFESSORS, AND THE GREAT CORAL REEF CONTROVERSY OF 1887-1888; D.R. Stoddart
ESH	07-02	99-110	JOSEPH BEETE JUKES, THE 'CAMBRIDGE CONNECTION', AND THE THEORY OF REEF DEVELOPMENT IN AUSTRALIA IN THE NINETEENTH CENTURY; D.R. Stoddart
ESH	07-02	111-120	CHARLES DARWIN'S THEORY OF CORAL REEFS AND THE PROBLEM OF THE CHALK; William Montgomery
ESH	07-02	121-125	THREE CONCEPTS OF FABRIC STATISTICS (CURIE 1884, SCHMIDT 1925, AND NIGGLI 1948) AND THEIR MODIFICATIONS AND ELABORATIONS, A HISTORICAL DISCUSSION; Martin Kirchmayer
ESH	07-02	126-133	THE IMAGINARY LYELLIAN REVOLUTION; Alberto Elena
ESH	07-02	134-139	AMERICA'S FIRST COMMERCIAL OIL WELL; R.G. Shepherd
ESH	07-02	140-145	THE ENDURING INFLUENCE OF HANS CLOOS (1885-1951); J.G. Dennis
ESH	07-02	146-150	EDWARD DANIEL CLARKE: THE FIRST PROFESSOR OF MINERALOGY AT CAMBRIDGE; Duane W. Roller
ESH	07-02	151-158	THE EVOLUTION OF CREATIONISM; John Reginald Armstrong
ESH	07-02	159-164	BOOK REVIEWS
ESH	07-02	165-167	INTERESTING PUBLICATIONS
ESH	07-02	168	CALENDAR

ESH	07-02	168	MISCELLANEA
ESH	07-02	169	ANNUAL INDEX

# AUTHOR INDEX TO VOLUME 7, 1988

ESH	07-02	151-158	ARMSTRONG, JOHN REGINALD The Evolution of Creationism
ESH	07-02	71-89	BRACKEN, ANN A Look Back at the Permian Reefs of West Texas and New Mexico in Rigby, J. Keith
ESH	07-01	45	BOWKER, KENT A. Albert Einstein and Meandering Rivers
ESH	07-02	140-145	DENNIS, J.G. The Enduring Influence of Hans Cloos (1885-1951)
ESH	07-02	126-133	ELENA, ALBERTO The Imaginary Lyellian Revolution
ESH	07-01	27-32	FAUL, CAROL A History of Geology and Education in China (to 1949) in Zhang, Dazheng
ESH	07-02	i	FRIEDMAN, GERALD M. Editorial
ESH	07-01	1-22	FRONDEL, CLIFFORD The Geological Sciences at Harvard University from 1788 to 1850
ESH	07-02	70	GREGORY, JOSEPH T. Preface: History of Reef Studies
ESH	07-01	23-26	HILL, MASON L. Misinterpretations of Some Early California Geologists (1865-1951)
ESH	07-02	121-125	KIRCHMAYER, MARTIN Three Concepts of Fabric Statistics (Curie 1884, Schmidt 1925, and Niggli 1948) and Their Modifications and Elaborations, A Historical Discussion
ESH	07-01	33-43	MAHLER, JULIANNE P. AND PFEFFERKORN, HERMANN W. The Influence of the University of Heidelberg on the Development of Geology in North America between 1860 and 1913
ESH	07-02	111-120	MONTGOMERY, WILLIAM Charles Darwin's Theory of Coral Reefs and the Problem of the Chalk
ESH	07-01	33-43	PFEFFERKORN, HERMANN W. The Influence of the University of Heidelberg on the Development of Geology in North America between 1860 and 1913 in Mahler, Julianne P.
ESH	07-02	71-89	RIGBY, J. KEITH AND BRACKEN, ANN A Look Back at the Permian Reefs of West Texas and New Mexico
ESH	07-02	146-150	ROLLER, DUANE W. Edward Daniel Clarke: The First Professor of Mineralogy at Cambridge
ESH	07-02	134-139	SHEPHERD, R.G. America's First Commercial Oil Well
ESH	07-01	46-51	SPRIGG, REGINALD C. On the 1946 Discovery of the Precambrian Ediacarian Fossil Fauna in South Australia
ESH	07-02	90-98	STODDART, D.R. The Duke, the Professors, and the Great Coral Reef Controversy of 1887-1888

- ESH 07-02 99-110 STODDART, D.R.  
Joseph Beete Jukes, the 'Cambridge Connection', and the Theory of Reef  
Development in Australia in the Nineteenth Century
- ESH 07-01 44 TEICHERT, CURT  
Jean Baptiste de Lamarck -- the First Environmentalist
- ESH 07-01 27-32 ZHANG, DAZHENG AND FAUL, CAROL  
A History of Geology and Education in China (to 1949)



## *Revista Latinoamericana de Historia de las Ciencias y la Tecnología*

Editor: Juan José Saldaña (University of Mexico)

*Quipu* (Latin American Journal of History of Science and Technology), is devoted to the history of science and technology in Latin America. Founded in 1984, it is published three times a year. Contributions are welcome and articles are accepted in Spanish, English, Portuguese and French. *Quipu* has become indispensable for all those who study Latin American science and technology as well as for scholars interested in the diffusion of science in different cultural contexts.

Subscription rates for 1989,  
including postage and handling:

Latin America:  
Individual US \$25  
Institutional US \$40

All other regions:  
Individual US \$25  
Institutional US \$60

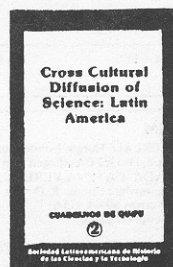
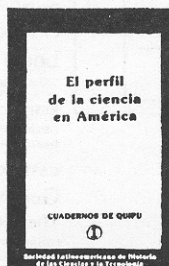


A complementary collection of *Quipu* is:

### QUIPU NOTEBOOKS

The price of each volume, including postage and handling:

Latin America: US \$10 All other regions: US \$15



Orders and subscriptions by check or money order:  
*Quipu*, Apartado Postal 21-873, 04000 México, D.F. MEXICO